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DIRECTORATE OF  
INTELLIGENCE

Industrial Facilities  
(Non-Military)

*Basic Imagery Interpretation Report*

Guryev Petroleum Refinery Lend-Lease 1

Guryev, USSR



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CENTRAL INTELLIGENCE AGENCY  
 Directorate of Intelligence  
 Imagery Analysis Service

INSTALLATION OR ACTIVITY NAME		COUNTRY
Guryev Petroleum Refinery Lend-Lease 1		UR
UTM COORDINATES	GEOGRAPHIC COORDINATES	25X1
39TWN717154	47-05-00N 051-56-50E	
MAP REFERENCE		
2nd RTS. USATC, Series 200, Sheet M0247-6HL, 3rd ed. Sep 67. Scale 1:200,000		
(SECRET)		
LATEST IMAGERY USED	NEGATION DATE (If required)	25X1
	NA	

## ABSTRACT

Guryev Petroleum Refinery Lend-Lease 1 is one of the smaller major Soviet refineries. Refining components include a crude oil distillation unit, a combination crude oil distillation-thermal cracking-thermal reforming unit, a fixed-bed catalytic cracking unit, a gas fractionating and processing unit, and an alkylation unit. Also, a probable catalytic reforming-hydrotreating unit is in the late stages of construction. Products from the refinery include straight-run, cracked and blended gasolines, kerosene, diesel and fuel oils, gaseous hydrocarbons, and petrochemical feedstocks.

The refinery was seen on overhead coverage in August 1961, but the poor quality of the photography precluded detailed analysis. In June 1962, when the refinery was seen again, all of the major equipment now operating was present except the crude oil distillation unit. There were no significant changes in facilities until late 1967, when the crude oil distillation unit was started. The distillation unit was completed by early 1970. Construction of a probable catalytic reforming-hydrotreating unit began in early 1969 and was not complete when the refinery was last seen in April 1971. At that time, unidentified construction was observed. The refinery was in operation on all photographic coverage from August 1961 to April 1971.

This report contains a detailed line drawing, a photograph, a listing of facilities with measurements of storage tanks, and a discussion of the status of facilities.

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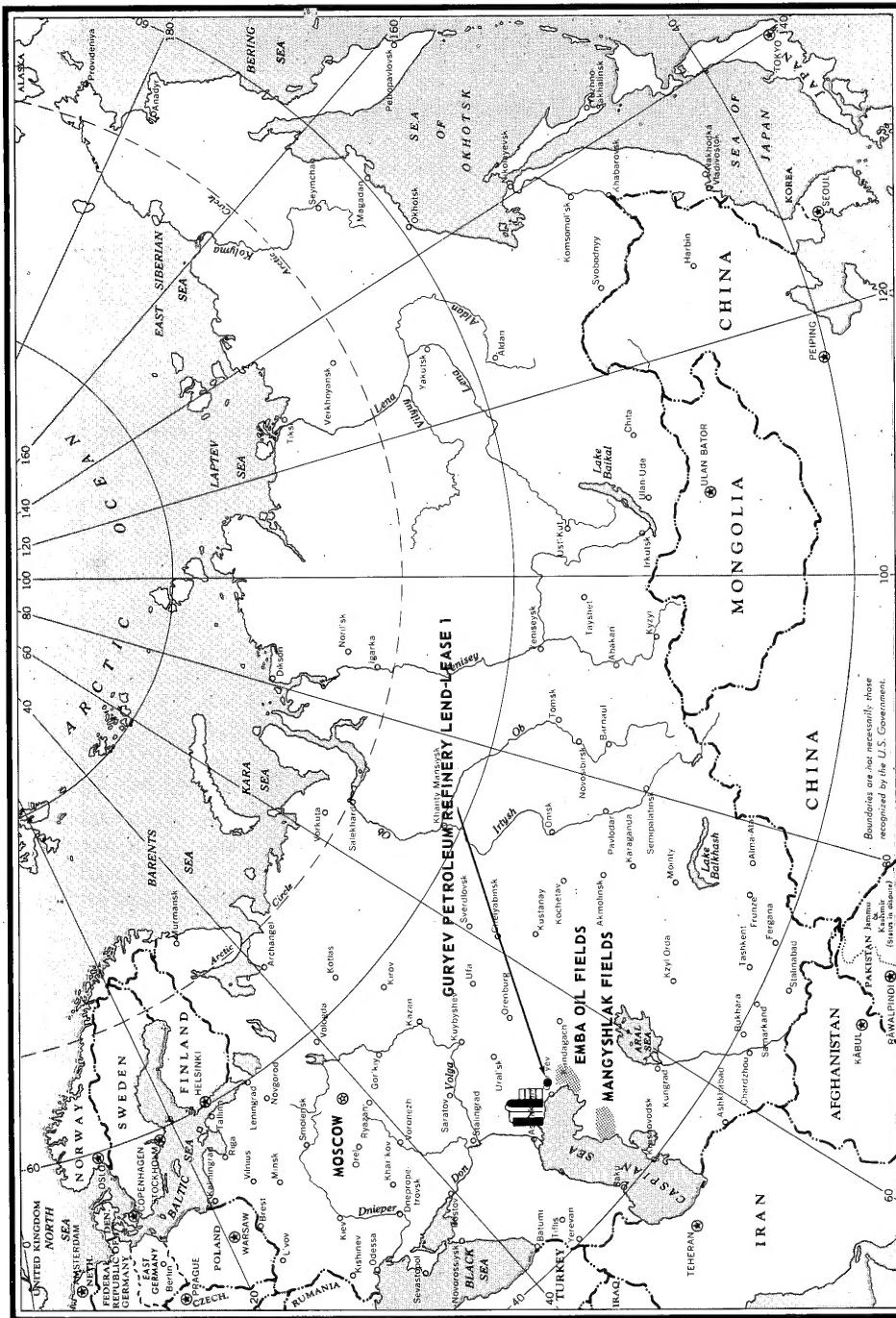


FIGURE 1. LOCATION MAP.

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25X1**INTRODUCTION**

Guryev Petroleum Refinery Lend-Lease 1 is located on the southeast edge of Guryev, on the east side of the Ural River and about 20 nautical miles northeast of the Caspian Sea (see Figures 1 and 2). The crude oil distillation capacity of this refinery is small in comparison to many of the major Soviet refineries. Also, much of the processing equipment is obsolescent by US standards, as it was installed between 1943 and 1945 under the Lend-Lease program. 1,2/

Most of the crude oil originally processed in the refinery was produced in the Emba Oil Fields. With increased production from the Mangyshlak Oil Fields starting in 1965-1966, crude oil from this area was scheduled for refining at Guryev, and this necessitated the expansion of facilities at the refinery. 2,3/

Crude oil and products are shipped into and out of the refinery by pipeline, railroad, and barge. Rail service is provided by a spur from the Guryev-Kandagach rail line and barge facilities are located on the nearby Ural River.

Electric power for the refinery is produced by the Guryev Heat and Thermal Power Plant TETS [redacted] which is collocated with the Guryev Chemical Plant [redacted] 25X1 25X1. The chemical plant is about 1,700 feet northeast of the refinery and receives raw materials from the refinery through aboveground pipelines.

**BASIC DESCRIPTION****Physical Features**

The refinery occupies a nearly rectangular area about 5,500 by 3,900 feet containing about 490 acres. The area is secured by a system of walls and fences. Most of the processing units are of US design and present a close-spaced, cluttered appearance. The newer units are of the standard Soviet design which is characterized by widely spaced equipment.

**Operational Functions**

The main function of this refinery is the production of fuels. No lubricating oil production facilities are present. The major refining equipment presently constructed and in operation include a crude oil distillation unit, a combination crude oil distillation-thermal cracking-thermal reforming unit, a fixed-bed catalytic cracking unit, a gas fractionating and processing unit, and a sulfuric acid alkylation unit.

The products of this refinery include straight-run, cracked and blended gasolines, kerosene, diesel and fuel oils, gaseous hydrocarbons, and petrochemical feedstocks.

**Construction and Operational Status**

In August 1961, the date of the earliest coverage used in this report, the refinery was in operation but the poor quality of the photography precluded detailed analysis. On photography of June 1962, the following refining units were complete and in operation:

1. Combination crude oil distillation-thermal cracking-thermal reforming unit.
2. Fixed-bed catalytic cracking unit.
3. Gas fractionating and processing unit.
4. Sulfuric acid alkylation unit.

Also, essentially all of the storage, shipping, support, and administration facilities were completed.

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Between June 1962 and late 1967 there were no significant changes in facilities except for the construction of a desalting unit near the combination crude oil distillation-thermal cracking-thermal reforming unit. This desalting unit was constructed between October 1964 and September 1966.

Photography of November 1967 showed that the refinery area had been expanded by about 20 percent. Grading and excavating had started for the new crude oil distillation unit (Area B) and the water cooling and treatment facilities (Area D). Throughout 1968 work proceeded slowly in these areas.

By July 1969, the crude oil distillation unit was nearly complete and site preparation was seen for a probable catalytic reforming-hydrotreating (CR-HT) unit. By March 1970, the crude oil distillation unit was complete but not yet in operation and the water cooling and treatment facilities were completed.

In April 1971, when the refinery was last seen, the crude oil distillation unit appeared to be in operation and the probable CR-HT unit was in the late stages of construction. Also, a probable oil-water separating facility and its associated storage tanks had been dismantled and unidentified construction was under way (Area A).

Completion of the crude oil distillation unit probably more than doubled the charge capacity of the refinery. The probable CR-HT unit will add significantly to the refinery's capacity to produce high-octane motor fuels.

The refinery was in operation on all photographic coverage from August 1961 to April 1971.

#### Facilities and Equipment

The following table lists the functional areas and the facilities and equipment in the refinery. All measurements are rounded to the nearest half-meter.

Table 1. Equipment and Facilities at the Guryev Petroleum Refinery Lend-Lease 1  
(Keyed to Figure 3)

<u>Area</u>	<u>Functional Description</u>	<u>Equipment and Facilities</u>
A	Water Treatment	5 Miscellaneous buildings 1 Water treatment reservoir 1 Cylindrical storage tank, 12 meters in diameter 2 Water storage basins 1 U/I area under construction
B	Crude Oil Distillation	1 Crude oil distillation unit with a row of 9 columns (1 vacuum, 2 atmospheric, and 6 stripping/ stabilizing columns) 2 Possible rerun columns 2 Banks of heat exchangers/ accumulators 2 Pipe furnaces 10 Miscellaneous buildings 4 Horizontal treating drums, [redacted]

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1 Desalting unit with 1 building,  
1 probable mixing column and  
5 desalting/settling drums

14 Cylindrical storage tanks  
2 12-meter-diameter  
9 [redacted]  
3 6-meter-diameter

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<u>Area</u>	<u>Functional Description</u>	<u>Equipment and Facilities</u>
C	Probable Catalytic Reforming-Hydrotreating	Late stage of construction -- facilities not listed
D	Water Cooling and Treatment	6 Miscellaneous buildings 3 Cooling towers, each with 5 cells 2 Water treatment reservoirs 1 Cylindrical storage tank, <span style="border: 1px solid black; display: inline-block; width: 150px; height: 1.2em; vertical-align: middle;"></span> 25X1 2 Horizontal settling drums, 27 meters long 2 Semiburied storage tanks (not measured) 1 Flare tower
E	Shipping and Storage	20 Storage and shipping buildings 1 Building u/c 3 Railcar loading racks 3 Cylindrical storage tanks 1 27-meter-diameter 1 24-meter-diameter 1 <span style="border: 1px solid black; display: inline-block; width: 150px; height: 1.2em; vertical-align: middle;"></span> 25X1 4 Horizontal storage tanks, 12 meters long 1 Water storage basin
F	Crude Oil, Intermediates, and Products Storage	16 Miscellaneous buildings 67 Cylindrical storage tanks 16 36-meter-diameter 6 30-meter-diameter 1 27-meter-diameter 22 24-meter-diameter 8 21-meter-diameter 6 15-meter-diameter <span style="border: 1px solid black; display: inline-block; width: 150px; height: 1.2em; vertical-align: middle;"></span> 25X1 4 12-meter-diameter 2 9-meter-diameter <span style="border: 1px solid black; display: inline-block; width: 150px; height: 1.2em; vertical-align: middle;"></span> 25X1 17 Horizontal storage tanks, <span style="border: 1px solid black; display: inline-block; width: 150px; height: 1.2em; vertical-align: middle;"></span> 25X1 1 Covered crude oil storage reservoir, 210 x 48 meters 2 Water storage basins
G	Secondary Processing (1) Alkylation	1 Sulfuric acid alkylation unit with 4 columns (1 deisobutanizer, 1 debutanizer, 1 depropanizer, and 1 rerun), 1 distillation building, 1 reactor building with 3 possible reactors, 1 acid and caustic settler building with 4 settling drums, 1 compressor/pump building, 1 compressor-cooling building with a bank of cooling coils/heat exchangers, 1 acid recovery building with 3 drums, 1 caustic recovery building, 3 support buildings, 5 surge and stock tanks (3-meter-diameter). 5 chemical storage tanks <span style="border: 1px solid black; display: inline-block; width: 150px; height: 1.2em; vertical-align: middle;"></span> 25X1 meter-diameter, one 6-meter-diameter, one <span style="border: 1px solid black; display: inline-block; width: 150px; height: 1.2em; vertical-align: middle;"></span> a25X1 two 3-meter-diameter), and 5 horizontal storage tanks (two 18 meters long, two 15 meters long, and one <span style="border: 1px solid black; display: inline-block; width: 150px; height: 1.2em; vertical-align: middle;"></span> 25X1

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<u>Area</u>	<u>Functional Description</u>	<u>Equipment and Facilities</u>
G (Cont)	(2) Intermediates Storage	1 Compressor/control building 6 Cylindrical storage tanks 2 12-meter-diameter 2 9-meter-diameter 2 [redacted] 25X1 4 Spherical storage tanks, [redacted] 25X1 6 Horizontal storage tanks, 18 meters long
H	Gas Fractionating and Processing	4 Columns (1 debutanizer, 1 depropanizer, 1 butane, and 1 stabilizing column) 1 Compressor/pump building 1 Compressor building 1 Air cooler 1 Building with 1 treating drum 4 Support buildings 2 Cylindrical storage tanks/dry gasholders, [redacted] 25X1 4 Horizontal storage tanks [redacted] 25X1
I	Steam Plant	1 Boilerhouse 8 Miscellaneous buildings 9 Cylindrical storage tanks 2 15-meter-diameter 2 [redacted] 25X1 5 3-meter-diameter
J	Treating and Blending	1 Control building 4 Miscellaneous storage/support buildings 6 Cylindrical storage/blending and treating tanks, [redacted] 25X1 in diameter
K	Secondary Processing (1) Catalytic Cracking	1 Fixed-bed catalytic cracking unit with 9 catalyst chambers, 3 fractionator/stabilizer columns, 2 probable absorbers, 2 clusters of u/i equipment, 2 pipe furnaces, 1 air cooler, 1 control/condenser building, 1 pump building, and 5 support buildings
	(2) Products Storage	1 Support building 11 Cylindrical storage tanks 1 24-meter-diameter 2 21-meter-diameter 2 15-meter-diameter 2 12-meter-diameter 1 9-meter-diameter 3 [redacted] 25X1 1 Water storage basin

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<u>Area</u>	<u>Functional Description</u>	<u>Equipment and Facilities</u>
L	Crude Oil Distillation and Secondary Processing	1 Combination unit with a crude oil distillation section with 1 topping and 1 atmospheric column; a thermal cracking section with 4 columns; a thermal reforming section with processing equipment in scaffolding; a caustic treating section with 1 row of 4 mixing/storage tanks (3-meter-diameter), 1 row of 4 mixing towers with 7 horizontal settlers, 1 cylindrical storage tank (3-meter-diameter), 3 horizontal tanks [redacted] 25X1 meters long and one [redacted] 25X1 long, and 1 building; a possible treating section with 1 building and 3 attached columns; 5 pipe furnaces; 5 air coolers; 1 control/condenser building; 2 support buildings; and 5 horizontal storage tanks (one 18 meters long, three [redacted] long, and one [redacted] 25X1 25X1 [redacted])
	(1) Crude Oil Distillation, Cracking and Reforming	
	(2) Desalting	1 Desalting unit with 1 building, 7 desalting drums/settlers, and 1 cylindrical storage tank, [redacted] 25X1 [redacted] 25X1
		1 Desalting unit with 3 buildings, 2 desalting spheres, 4 desalting/settling drums, and 1 bank of heat exchangers
	2 Support buildings	
M	(3) Products and Intermediates Storage	1 Building with 2 probable settling drums
		8 Cylindrical storage tanks 6 15-meter-diameter
		2 Horizontal storage tanks 1 15-meter-long
		1 Water storage basin
Administration and Support	21 Miscellaneous buildings	

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## REFERENCES

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## Map

2nd RTS. US Air Target Chart, Series 200, Sheet M0247-6HL. 3rd edition.  
September 1967. Scale 1:200,000 (SECRET)

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## Documents

1. CIA. [REDACTED] Card No. 6036759, 19 December 1955 (SECRET) 25X1
2. CIA. [REDACTED] JPRS 49641, 20 January 1970 (UNCLASSIFIED)
3. The Petroleum Publishing Co., International Petroleum Encyclopedia, 1969 edition (UNCLASSIFIED)

## Requirement

COMIREX N02  
Support Number 429225

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